

REMARKS

The foregoing amendment amends the title and claim 1, and adds claims 5 and 6. Pending in the application are claims 1-6, of which claim 1 is independent. The following comments address all stated grounds for rejection and place the presently pending claims, as identified above, in condition for allowance.

Claim 1 is amended to positively recite that the fuel cell includes a sealing member disposed between the membrane electrode assembly and the pair of separators. *No new matter is added.*

Amendment of the claims are not to be construed as an acquiescence to any of the objections/rejections set forth in the instant Office Action, and were done solely to expedite prosecution of the application. Applicants reserve the right to pursue the claims as originally filed, or similar claims, in this or one or more subsequent patent applications.

Objections to the Specification

Regarding the objection to the title, Applicants have amended the title of the invention to "A Fuel Cell Separator Having a Channel Formed Using a Sealing Member". As the new title is clearly indicative of the invention to which the claims are directed, Applicants respectfully request that the objection be reconsidered and withdrawn.

35 U.S.C. 102 Rejections

In the Office Action, the Examiner rejects claims 1-4 under 35 U.S.C. 102(b) as being anticipated by Davis (GB 2,326,017). Applicants traverse the rejection and submit that the pending claims 1-5, as identified above, are patentable over the cited references. The Davis reference does not teach or suggest a fuel cell including a reactant gas channel disposed between a membrane electrode assembly and a separator, where a part of the reactant gas channel is formed *seamlessly by a part of a sealing member*, as recited in independent claim 1.

The Davis reference describes a fuel cell including a bipolar plate disposed between two electrode assemblies, such that one major face of the bipolar plate is adjacent to and adhesively bonded to a major surface of the first electrode assembly anode. The other major face of the bipolar plate is adjacent to and adhesively bonded to a major surface of the second electrode assembly cathode.

According to the Examiner, the Davis reference teaches that the bonding or adhesion of a separator forms a seamless gas channel with the electrode, and therefore, the Davis reference anticipates claim 1. Applicants respectfully disagree. The present invention does not relate to a seamless gas channel formed with an electrode, as alleged by the Examiner. Rather, as recited in claim 1, a part of the reactant gas channel is formed seamlessly by a part of a *sealing member*, a feature neither taught nor suggested by the Davis reference.

In the Davis reference, *all* of the grooves for distributing gases to the anode and cathode (denoted by reference number 37) are formed in the surface of the bipolar plate. The Davis reference lacks a teaching or a suggestion that a sealing member forms a portion of any of the grooves.

In contrast, claim 1 recites a fuel cell including a reactant gas channel, a part of which is formed seamlessly by a sealing member. Without limiting the scope of the claims, in an illustrative embodiment of the invention, a portion of a sealing member that is disposed between a separator and a membrane electrode assembly extends between a plurality of grooves formed on the separator. The grooves and the extended portion of the sealing member form a reactant gas channel.

For example, Figure 1 illustrates an embodiment of the invention, where a sealing member CS between communicating holes 12Ca and 13C extends across a flat surface H on a first side of the separator 10 between grooves 18, to form a boundary portion of the reaction channel 211. Similarly, the sealing member CS between the communicating holes 13C and 12Cb of the separator 10 extends between the grooves 18 to form a boundary portion of the reactant gas channel 212. The sealing members CS, including the extended portions CS1 and CS2 forming part of the reaction channels 211 and 212, respectively, extend *without a seam* along the surface of the separator 10.

As shown in Figure 2, which shows a second side, i.e., the cooling plane, of the separator 10 of Figure 1, sealing members RS include extended portions RS1 and RS2. The extended portions RS1 and RS2 extend seamlessly between the protruding members 19 to form boundary portions of a reactant gas channel, which is illustrated as a meandering coolant channel 25.

Similarly, extended portions AS1, AS2, RS1 and RS2 of sealing members formed on a plane of the anode side separator 11 form boundary portions of reactant gas channels across the surfaces of the anode side separator 11, as shown in Figures 3 and 4.

An advantage of the claimed configuration is that the portion of the separator where the sealing member is arranged to form a part of the reactant gas channel may be flat. The flat surface provides an increased degree of freedom in designing the shape of the reactant gas channel, a feature neither taught nor suggested in the cited references. In addition, the use of a portion of a sealing member to seamlessly form a part of a reactant gas channel prevents gas leakage as the junction portion.

One skilled in the art will recognize that claim 1 is intended to encompass a fuel cell where *any* suitable portion of the sealing member forms *any* suitable portion of a reactant gas channel disposed between a membrane electrode assembly and a separator, a feature neither taught nor suggested in the cited prior art.

In contrast, the grooves 37 of the Davis reference are formed entirely within the surface of the bipolar plate, as described on page 5, lines 26 through page 6, line 3. When the thermoplastic bipolar plate is adhesively bonded, the gas distribution channels are sealed from each other, as described on page 6, lines 7-9, rather than actually form a portion of the grooves.

To support Applicants' position that the Davis reference does not teach or suggest a portion of a sealing member forming a part of a reaction gas channel in a fuel cell, Applicants submit herewith in Appendix A, diagrams of the bipolar plate of Davis. The enclosed diagrams illustrate the bipolar plate of Davis from a plan view, corresponding to the view of the separators of the illustrative embodiment of the invention in Figures 1-4 of the present

application. Figure A corresponds to the bipolar plate of Figure 3 of Davis as viewed from the A-A direction. Figure B corresponds to Figure 4 of Davis as viewed from the B-B direction.

As clearly shown, the grooves in the bipolar plates are formed by machining or otherwise deforming the surface of the bipolar plate, and are not formed seamlessly by a sealing member. In addition, the reaction gas channel of Davis is *separated* from the side of the bipolar plate, and clearly cannot be formed by an *extended* portion of a sealing member, as recited in dependent claims 5 and 6. In addition, the reactant gas channel of Davis does not have a turning portion having a boundary portion that is constituted by at least a part of said sealing member, as recited in claims 3 and 4.

For at least these reasons, claim 1, and dependent claims 2-6 are patentable over the Davis reference.

35. U.S.C. 103(a) Rejections

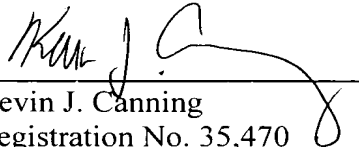
As described above, the Davis reference does not teach or suggest seamlessly forming a part of a gas reactant channel by a part of a sealing member, as recited in claim 1. The Japanese Publication Number 2000-021418 of Nashida Kazufumi does not compensate for the deficiencies of the Davis reference. In particular, the Nashida Kazufumi reference lacks a teaching or suggestion of a gas reactant channel formed at least partially by a sealing member. Therefore, claims 2-6, which depend from claim 1, as also patentable.

CONCLUSION

In view of the foregoing, favorable reconsideration and withdrawal of all the rejections, and allowance of the instant application with all pending claims are respectfully solicited. If there are any remaining issues, an opportunity for an interview is requested prior to the issuance of another Office Action. If the above amendments are not deemed to place this case in condition for allowance, the Examiner is urged to call the Applicants' representative at the telephone number listed below.

Respectfully submitted,

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